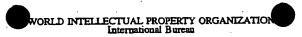
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(57) Abstract

Mammalian hair is depilated using a laser source capable of emitting pulsed radiation, each pulse having a duration of 1μ s to 1ms, the radiation having a wavelength in the range of 600 to 1500mm. A selected area of a patient's skin is irradiated by the pulsed radiation, the area having a plurality of irradiation zones; the laser source is successively pulsed so as to irradiate successive zones of the treatment area with the radiation, so as to destroy subdermal biological material associated with hair growth.

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Depilation

The present invention is concerned with a method of depilation of mammalian hair and also apparatus for use in the method.

U.S. Patents 3538919 and 4617926 are both concerned with depilation. These patents teach the stepwise irradiation of single hairs or hair follicles; the process described in U.S. 3538919 involves inserting a laser probe within a hair follicle and the process described in U.S. 4617926 involves inserting a single hair within a bore of a fibre optic probe. These processes are time consuming, and can lead to unnecessary discomfort to a patient.

We have now developed a method and apparatus which alleviates the above problems.

According to the present invention there is provided a method of depilation of mammalian hair, which method comprises:

- (a) providing a laser source capable of emitting pulsed radiation, each pulse having a duration of 1μ s to 1ms, said radiation having a wavelength in the range of 600 to 1500nm;
- (b) selecting a treatment area of a patient's skin to be irradiated by said pulsed radiation, said treatment area including a plurality of irradiation zones; and
- (c) successively pulsing said laser source so as to irradiate successive zones of said treatment area with said radiation, so as to destroy subdermal biological material associated with hair growth.

It is preferred that the laser source comprises either a ruby laser (wavelength 694.3nm), a neodymium YAG laser (wavelength $1.064\mu m$) or other lasers having a wavelength in the abovementioned (visible red to near infra-red) range. The selection of a laser having a wavelength in the range of 600 to 1500nm is advantageous in that radiation of this wavelength is capable of selectively destroying cells or other subdermal biological material responsible for hair growth, whilst not being substantially absorbed by surrounding cells or tissue.

It is preferred that a laser with variable pulse duration is used. This is advantageous in facilitating irradiation of selected intensity, depending on the required application of the laser.

Advantageously, the irradiation zones are juxtaposed so as to substantially cover the treatment area. Preferably the successive irradiation involves irradiation in boustrophedon manner, so as to ensure substantially complete irradiation of the treatment area.

It is preferred that the irradiation destroys cells present at the root of individual hair follicles; optionally, the irradiation may further destroy cells present in respective bulge regions of follicles.

There is further provided by the present invention depilation apparatus for use in a method as described above, the apparatus comprising:

- (a) a laser source capable of emitting pulsed radiation, wherein each pulse has a duration of 1μ s to 1ms, the radiation having a wavelength in the range of 600-1500nm; and
- (b) means for irradiating a zone of a patient's skin with said radiation, so as to be capable of destroying biological material present in said irradiation zone, associated with hair growth.

The apparatus may advantageously further comprise means for effecting irradiation of successive zones of the patient's skin. Typically, means are provided for effecting movement of the apparatus relative to the patient's skin so as to irradiate the skin in a boustrophedon manner substantially as described above.

Claims:

- 1. A method of depilation of mammalian hair, which method comprises:
 - (a) providing a laser source capable of emitting pulsed radiation, each pulse having a duration of 1μ s to 1ms, said radiation having a wavelength in the range of 600 to 1500nm;
 - (b) selecting a treatment area of a patient's skin to be irradiated by said pulsed radiation, said treatment area including a plurality of irradiation zones; and
 - (c) successively pulsing said laser source so as to irradiate successive zones of said treatment area with said radiation, so as to destroy subdermal biological material associated with hair growth.
- A method according to claim 1, wherein said laser source comprises a ruby laser having a wavelength of 694.3nm or a neodymium YAG laser having a wavelength of 1.064μm.
- 3. A method according to claim 1 or 2, wherein said laser source has a variable pulse duration.
- 4. A method according to any of claims 1 to 3, wherein said irradiation zones are juxtaposed so as to substantially cover said treatment area.
- 5. A method according to any of claims 1 to 4, wherein said successive irradiation of said treatment area is in boustrophedon manner, so as to ensure substantially complete irradiation of said treatment area.
- 6. Depilation apparatus for use in a method according to any of claims 1 to 5, said apparatus comprising:
 - (a) a laser source capable of emitting pulsed radiation, wherein each pulse has a duration of 1μ s to 1ms, the radiation having a wavelength in the range of 600-1500nm; and
 - (b) means for irradiating a zone of a patient's skin with said radiation, so as to be capable of destroying biological material present in said irradiation zone, associated with hair growth.

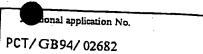
- 7. Apparatus according to claim 6, which further comprises means for effecting irradiation of successive zones of a patient's skin.
- 8. Apparatus according to claim 6 or 7, which includes means for effecting movement of said apparatus relative to said patient's skin so as to irradiate said skin in a boustrophedon manner.

INTERNATIONAL SEARCH REPORT

Inter	mal	Application	No
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A. CLASSIF	FICATION OF SUBJECT MATTER A61B17/41		
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Category *	Citation of document, with indication, where appropriate, of the rel	evant passages	Relevant to claim No.
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X	WO,A,92 19165 (VICTORIA UNIVERSIT MANCHESTER) 12 November 1992	1 UF	6,7
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Fur	ther documents are listed in the continuation of box C.	X Patent family members are listed	in annex.
* Special c	ategories of cited documents:	T later document published after the in	ternational filing date
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INTERNATIONAL SEARCH REPORT



Box I		PC17 GB94/ 02682
DUX 1	Observations where certain claims were found unsearchable (Continuation of i	tem 1 of first sheet)
This inter	national search report has not been established in respect of certain claims under Artic	ale 17(2)(a) for the following reasons:
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	reause they are dependent claims and are not drafted in accordance with the second and	d third sentences of Rule 6.4(a).
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his Intern	ational Searching Authority found multiple inventions in this international application,	as follows:
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No rest	required additional search fees were timely paid by the applicant. Consequently, this in ricted to the invention first mentioned in the claims; it is covered by claims Nos.:	iternational search report is
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nark on Pr	The additional search fees were accomp	panied by the applicant's protest.
	No protest accompanied the payment of	of additional search fees.

INTERNATIONAL SEARCH REPORT

information on patent family members

International Application No GB 94/02682

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